Can We Differentiate Neurocardiogenic Syncope Types By Using Heart Recovery Indices Before Performing Head-up Tilt Testing

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SHORT COMMUNICATION

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Syncope is commonly seen clinical finding which accounts for %6 of hospital admission and %3 of emergency departments \[^[1]\]. Neurocardiogenic syncope is the most common cause of syncope \[^[2]\]. The uncontrolled response of autonomic nervous system has been implicated in neurocardiogenic syncope. Increased parasympathetic response to an increased sympathetic activity in neurocardiogenic syncope causes an imbalance in the autonomic nervous system, and they, therefore, seem to play a role in the pathophysiology of neurocardiogenic syncope \[^[3,4]\]. As a result of exaggerated parasympathetic response, patients may experienced syncope due to vasodilatation related hypotension or due to excessive bradycardia. The mixed form of vasodilatation and bradycardia can be seen in the other syncope groups. However, we cannot differentiate neurocardiogenic forms without performing head-up tilt testing (HUTT) \[^[5]\]. After exercise stress testing, Heart Rate Recovery (HRR) is one of the commonly used
parameters that reflects autonomic activity. HRR indices show the rate of decline in the heart rate (HR) after termination of an exercise test and are defined as the HR difference between the maximal HR during exercise stress testing and the HR during the recovery phase. Heart rate recovery after the first minute of exercise is mainly controlled by the parasympathetic nervous system. We aim to investigate HRR as indices of parasympathetic tonus for differentiation of neurocardiogenic syncope types. In this study 131 patients who experienced neurocardiogenic syncope during HUTT and 50 healthy control groups were enrolled. For evaluation of heart rate recovery indices all patients underwent an exercise stress test without a cool-down period with Bruce protocol, aiming to reach maximal of age predicted heart rates. Heart rate recovery indices were calculated by subtracting first-minute heart rates from the maximal heart rate attained during stress testing which was designated as Rec1. Statistical analyses were performed by using SPSS 18 windows (SPSS Inc. Chicago, Illinois, USA). Continuous variables were expressed as the mean± standard deviation (mean±SD) and categorical variables were expressed as a percentage (%). Kolmogorov-Smirnov test was used to determine whether or not the data of the study were normally distributed. Chi-square test was used for the compare categorical values between groups. One-way ANOVA test was used in order to compare the continuous variables. The intra-group differences were evaluated by using Tukey post-hoc analysis. The value of the heart rate recovery index for predicting the cardioinhibitory syncope was evaluated by using ROC (receiver operating characteristics) analysis. The statistical significance was accepted when the p value was less than 0.05 (p<0.05).

40 patients experienced cardioinhibitory syncope, 50 vasodepressor syncope, and 32 mixed type syncope. There is no difference between syncope and control groups in terms of age, gender, height, weight and body mass index. And also total exercise time, maximal METs, maximal heart rate and maximal systolic blood pressure similar between groups (p>0.005). REC1 was higher in syncope groups (p<0.001). In a post-hoc analysis, REC1 was similar between vasodepressor (42.2±7.7) and mixed syncope (40.8±4.5) groups (p=0.789). However, REC1 was higher in the cardioinhibitory group (47±8.8) than the other syncope types (vasodepressor (42.2±7.7) and mixed type syncope (40.8±4.5) ) and control group (34.4±4.9) (p<0.05). A cutoff value of REC1 40.5 had 75% sensitivity and 63% specificity for the diagnosis of cardioinhibitory syncope.

Both in the HUTT and exercise stress test, at the beginning sympathetic activity increases and parasympathetic activity decreases and then parasympathetic activity, predominates especially in the first minute of the recovery period and determines the heart rate recovery index. Exaggerated parasympathetic response causes excessive bradycardia or pause in patients with cardioinhibitory syncope. Also, those patients experienced a rapid decline in heart rate in the recovery phase of exercise stress test. We can infer that cardioinhibitory syncope patients have strong parasympathetic activity which predominantly affects heart rate during HUTT and exercises stress testing.
REFERENCES


